

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final: 2/5/99

**RCRA Corrective Action
Environmental Indicator (EI) RCRIS Code (CA750)
Migration of Contaminated Groundwater Under Control**

Facility Name: Akzo Nobel Polymer Chemicals, LLC
Facility Address: 2153 Lockport-Olcott Road, Burt, NY 14028
Facility EPA ID#: NYD043815158

1. Has all available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g. from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been considered in this EI determination?

If yes - check here and continue with #2 below.

If no - re-evaluate existing date, or

If data are not available, skip to #8 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programming activity measures (e.g. reports received and approved etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e. site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (ie. further spread) of contaminated groundwater and contaminants within groundwater (e.g. non-aqueous phase liquids of NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration/Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national databases ONLY as long as they remain true (i.e. RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

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Background

The 350 acre Akzo Nobel property is located at 2153 Lockport-Olcott Road in the Hamlet of Burt, Niagara County, New York. Akzo Nobel produced organic peroxides including benzoyl Peroxide, methyl ethyl ketone peroxide, acyl acetone peroxide, and 2,4-dichlorobenzoyl peroxide at the Burt, New York facility.

The production portion of the facility encompassed approximately 30 acres, and approximately 80 acres of the property were fenced. Areas associated with Akzo Nobel operations included: buildings, hazardous waste container storage pads, inactive landfills, an inactive burning cage, a closed clay storage pad, venturi scrubbers, a fume scrubber, drum storage areas, a closed waste sulfuric acid storage tank, closed underground storage tank (UST) locations, a fire pond, and numerous structures associated with the wastewater treatment facility and process sewer.

Akzo Nobel ceased organic peroxide manufacturing operations in 2003 and the Burt facility remains in operation as a warehouse and distribution center.

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2. Is **groundwater** known or reasonably suspected to be “contaminated”¹ above appropriately protective “levels” (i.e. applicable promulgated standards, as well as other appropriate standards, guidelines, guidance or criteria) from releases subject to RCRA Corrective Action, anywhere at or from the facility?

If yes - continue after identifying key contaminants, citing appropriate “levels” and referencing supporting documentation.

If no - skip to #8 and enter “YE” status code, after citing appropriate “levels” and referencing supporting documentation to demonstrate that groundwater is not “contaminated”.

If unknown - skip to #8 and enter “IN” status code.

Rationale and Reference:

Groundwater quality data were generated via installation, development, and sampling of 9 overburden and 4 bedrock monitoring wells at th Akzo Nobel facility in Burt, New York in 1999 - 2002. Data generated to date support the conclusion that overburden groundwater quality has been locally impacted by releases of certain volatile organic compounds at the Akzo Nobel, Burt, NY facility. The extent of impact is limited to within the facility property.

Reference: TRC, CMS Final Report, May 2003

Footnotes:

¹“Contamination” and “contaminated” describe media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate “levels” (appropriate for the protection of the groundwater resource and its beneficial use).

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3. Has the **migration** of contaminated groundwater stabilized (such that contaminated groundwater is expected to remain within "existing areas of contaminated groundwater" as defined by the monitoring locations designated at the time of this determination)?

If yes - continue, after presenting or referencing the physical evidence (e.g. groundwater sampling/measurements/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"²).

If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination") - skip to #8 and enter "NO" status code, after providing an explanation.

If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

The groundwater data gathered during 1999 - 2002 indicate the combined effects of abiotic and biotic attenuation appear to limit the extent of contaminants in groundwater to a finite area of the overburden within the property boundary and within the limited industrialized section of the Akzo Nobel facility. Contaminants have not been detected in excess of groundwater standards in down gradient overburden groundwater at wells MW-3, MW-4 and bedrock groundwater at wells MW-3B, MW-4B. Evaluation of contaminant plume sequence maps illustrate a relatively stable contaminant plume condition in the overburden groundwater, with some contaminant plumes disappearing over the course of study.

Reference: TRC, CMS Final Report, May 2003

²"existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e. including public participation) allowing a limited area of natural attenuation.

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4. Does "contaminated" groundwater **discharge** into **surface water** bodies?

___ If yes - continue identifying potentially affected surface water bodies.

X If no - skip to #7 (and enter "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination: does not enter surface water bodies.

___ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

Groundwater discharge for portions of the facility west of the on-site pond is west-northwest, towards the course of Eighteenmile Creek, located approximately 300 feet to the west of the property at a considerably lower elevation. Eighteenmile Creek flows to Lake Ontario, approximately 2 miles downstream.

Groundwater has the potential to flow downward to the west of the facility, and slightly upward in the east portion of the facility. Groundwater moves considerably faster in overburden than in the upper bedrock, based on hydraulic conductivities measured during the RFI. The groundwater elevations in the overburden are significantly higher (over 10 ft. in some cases) than the groundwater elevations in the upper bedrock, indicative of a very limited flow connection between the overburden and bedrock groundwater.

Down gradient water table wells confirm the general absence of volatile organic contaminants down gradient of the main portion of the facility. Upper bedrock groundwater quality data was obtained from 4 bedrock wells. Groundwater data from the bedrock wells sampling confirms the general absence of volatile organic contaminants in bedrock groundwater down gradient from the facility.

Reference: TRC, CMS Final Report , May 2003

impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented⁴)?

- _____ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems) and referencing supporting documentation that these criteria are not exceeded by the discharging groundwater; OR

2) providing or referencing an interim-assessment⁵ appropriate to the potential for impact, that shows the discharge of groundwater contaminants in to the surface water is (in the opinion of a trained specialist, including ecologist) adequately protective of receiving surface water, sediments and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels", as well as any other factors, such as effects on ecological receptors (e.g. via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

- _____ If no - (the discharge of "contaminated" groundwater cannot be shown to be "currently acceptable") - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

- _____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

⁴Note, because areas of inflowing groundwater can be critical habitats (e.g. nurseries or thermal refugia) for many species, appropriate specialist (e.g. ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

⁵The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

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7. Will groundwater monitoring/measurement data (and surface water/sediment ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater"?

- If yes - continue after providing or citing documentation for planned activities or future

sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination".

____ If no - enter "NO" status code in #8.

____ If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

A formalized monitoring program will be developed for the Akzo Nobel facility, specifying the location, frequency, and type of samples and measurements necessary to evaluate remedy performance, as well as defining the anticipated performance objectives of the remedy.

The monitoring program will be designed to: 1) demonstrate that natural attenuation is occurring according to expectations; 2) identify any potentially toxic transformation products resulting from biodegradation; 3) determine if a plume is expanding (either downgradient, laterally or vertically); and 4) ensure no impact to downgradient receptors.

The monitoring program will also be designed to:

1) detect new releases of contaminants to the environment that could impact the effectiveness of the natural attenuation remedy; detect changes in environmental conditions (e.g. hydrogeologic, geochemical, microbiological or other changes) that may reduce the efficacy of any of the natural attenuation processes; and 2) verify attainment of cleanup objectives.

Performance monitoring will continue as long as contamination remains above 6 NYCRR 703.5 groundwater standards. Monitoring will continue for a period after cleanup levels have been achieved, to ensure that concentration levels are stable and remain below target levels.

Reference: TRC, CMS Final Report, May 2003

Attachment 1

Evaluation of Site Contamination

Site contamination is limited to soil and groundwater contamination. No natural surface watercourses exist at the Akzo Nobel, Burt, NY facility.

Table 1 presents the threshold action levels for soil and groundwater to which detected sample concentrations are compared. Action levels for soil and groundwater are derived from TAGM 4046 and 6 NYCRR 703.5 Standards.

REFERENCE: TRC, Phase II Report, December 2000

Table 2 presents Maximum Detects, Groundwater Data Summary, based on data from TRC, CMS Final Report, May 2003

Soil data is presented in Table 2A; see TRC, Phase II Report, December 2000

Table 3 presents well information; see TRC, CMS Final Report, May 2003

| TABLE 1. ACTION LEVELS FOR SOIL AND GROUNDWATER | | | |
|--|----------------------------|-------------------------|-------------------------------|
| Threshold (a) Action Level | | | |
| Contaminant | Media w/ Exceedance | Soil (b) (mg/kg) | Groundwater (b) (ug/L) |
| Acetone | Soil, GW | 0.2 | 50 |
| Benzene | GW | 0.06 | |
| 2-Butanone | Soil, GW | 0.3 | 50 |
| Chlorobenzene | GW | 1.7 | 5 |
| Chloroform | Soil | 0.3 | 7 |
| Chloromethane | GW | N/A | 5 |
| 1,2-Dichlorobenzene | GW | 7.9 | 3 |
| 1,3-Dichlorobenzene | GW | 1.6 | 3 |
| 1,4-Dichlorobenzene | GW | 8.5 | 3 |
| 1,1-Dichloroethane | GW | 0.2 | 5 |
| 1,2-Dichloroethane | GW | 0.1 | 0.6 |
| 1,2-Dichloroethane (cis) | GW | 0.25 | 5 |
| Ethylbenzene | GW | 5.5 | 5 |
| 4-Methyl-2-pentanone | Soil | 1 | 50 |
| Styrene | GW | N/A | 5 |
| Toluene | GW | 1.5 | 5 |
| 1,1,1-Trichloroethane | GW | 0.8 | 5 |
| Trichloroethene | GW | 0.7 | 5 |
| Vinyl Chloride | GW | 0.2 | 2 |
| Xylenes (Total) | GW | 1.2 | 5 |
| Butylbenzylphthalate | Soil | 50 | 50 |
| Di-n-butylphthalate | Soil | 8.1 | 50 |
| Napthalene | Soil, GW | 13 | 10 |
| Dimethylphthalate | Soil | 2 | 50 |
| Acetophenone | Soil | 50 | N/A |
| Benzo(a)pyrene | Soil | 6.061 or MDL | 0.002 (ND) |
| TPH | Soil | N/A | N/A |

(*) The threshold action level is the concentration below which no further action will be taken. Concentrations detected above the threshold may require additional investigation and/or remediation.

(b) Value derived from TAGM 4046

*Value derived from 6 NYCRR 703.5 Standards for combined dichloropropenes

N/A = not available

MDL = Method Detection Limit

**TABLE 2 MAXIMUM DETECTS
GROUNDWATER DATA SUMMARY**

| Unit/Compound | 6 NYCRR 703.5 GW Standards Revised 3/22/99 | MW-01 ug/L | MW-1B ug/L | MW-02 ug/L | MW-03 ug/L | MW-3B ug/L | MW-04 ug/L |
|---------------------------|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Acetone | 50 | U | 28 J | U | U | U | U |
| Benzene | 1 | 0.2 | 2.6 | 66 | 0.5 | U | U |
| Bromodichloromethane | 50 | U | U | U | U | U | U |
| Bromoform | 5 | U | U | U | U | U | U |
| Bromomethane | 5 | U | U | U | U | U | U |
| 2-Butanone | 50 | U | 6.2 J | U | U | U | U |
| Carbon Disulfide | 50 | U | U | U | U | U | U |
| Carbon Tetrachloride | 5 | U | U | U | U | U | U |
| Chlorobenzene | 5 | U | U | 10 | U | U | U |
| Chloroethane | 5 | U | U | 120 | U | U | U |
| 2-Chloroethylvinylether | 5 | U | U | U | U | U | U |
| Chloroform | 7 | U | U | U | U | U | U |
| Chloromethane | 5 | U | U | U | U | U | U |
| Dibromochloromethane | 50 | U | U | U | U | U | U |
| 1,2-Dichlorobenzene | 3 | U | U | 4.8 | U | U | U |
| 1,3-Dichlorobenzene | 3 | U | U | 4.3 | U | U | U |
| 1,4-Dichlorobenzene | 3 | U | U | 1.8 | U | U | U |
| 1,1-Dichloroethane | 5 | U | U | 630 | U | 0.4 | U |
| 1,2-Dichloroethane | 0.6 | U | U | U | 0.6 | 0.5 | U |
| 1,1-Dichloroethene | 5 | U | U | U | U | U | U |
| cis-1,2-Dichloroethene | 5 | U | U | 70 J | U | U | U |
| trans-1,2-Dichloroethene | 5 | U | U | U | U | U | U |
| Dichloromethane | 5 | U | U | 21 | U | U | U |
| 1,2-Dichloropropane | 1 | U | U | U | U | U | U |
| cis-1,3-Dichloropropene | 0.4* | U | U | U | U | U | U |
| trans-1,3-Dichloropropene | 0.4* | U | U | U | U | U | U |
| Ethylbenzene | 5 | U | U | 16 | U | U | U |
| 2-Hexanone | 50 | 1.5 J | 2.3 J | U | U | U | U |
| 4-Methyl-2-Pentanone | 50 | 1.6 J | U | U | U | U | U |
| Styrene | 5 | 0.4 | U | U | U | U | U |
| 1,1,2-Tetrachloroethane | 5 | U | U | U | U | U | U |
| Tetrachlorethene | 5 | U | U | U | U | U | U |
| Toluene | 5 | 0.2 | 0.4 | 9800 | 2.1 | U | U |
| 1,1,1-Trichloroethane | 5 | U | U | U | U | U | U |
| 1,1,2-Trichloroethane | 1 | U | U | U | U | U | U |

| | | | | | | | |
|-----------------|---|-----|---|------|-----|---|-----|
| Trichloroethene | 5 | U | U | U | 0.4 | U | U |
| Vinyl Acetate | 5 | U | U | U | U | U | U |
| Vinyl Chloride | 2 | U | U | 62 J | U | U | U |
| Xylene (Total) | 5 | 0.4 | U | 72 J | U | U | 0.4 |

Data validation qualifiers applied by TRC
TMC data not validated

NS = Not Sampled
J = Estimated

NA = Not Applicable

* = Applies to sum of cis and trans

U = Not Detected

**TABLE 2 MAXIMUM DETECTS
GROUNDWATER DATA SUMMARY TABLE**

| Units/Compounds | GW Standards Revised 3/22/99 | ug/L |
|---------------------------|-------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Acetone | 50 | U | 130 J | U | 2100 J | 170 | U | U |
| Benzene | 1 | U | U | 9.4 | 100 | 6.2 | U | U |
| Bromodichloromethane | 50 | U | U | U | U | U | U | U |
| Bromoform | 5 | U | U | U | U | U | U | U |
| Bromomethane | 5 | U | U | U | U | U | U | U |
| 2-Butanone | 50 | U | U | U | 2900 | U | U | U |
| Carbon Disulfide | 50 | U | U | U | 9.3 J | U | U | U |
| Carbon Tetrachloride | 5 | U | U | U | U | U | U | U |
| Chlorobenzene | 5 | U | U | 7.8 | 44 | 17 | U | U |
| Chloroethane | 5 | U | 0.6 | 3.7 | 17 J | 3 | U | U |
| 2-Chloroethylvinylether | 5 | U | U | U | U | U | U | U |
| Chloroform | 7 | U | U | U | U | U | U | U |
| Chloromethane | 5 | U | U | U | 12 | U | U | U |
| Dichromochloromethane | 50 | U | U | U | U | U | U | U |
| 1,2-Dichlorobenzene | 3 | U | U | 1.6 | 25 J | 3.7 | U | U |
| 1,3-Dichlorobenzene | 3 | U | U | 0.6 | 17 J | 1.3 | U | U |
| 1,4-Dichlorobenzene | 3 | U | U | 1.2 | 19 J | 1.9 | U | U |
| 1,1-Dichloroethane | 5 | U | 0.4 | 1.5 | U | 22.7 | 1.3 | U |
| 1,2-Dichlorethane | 0.6 | U | U | U | U | 1 | U | U |
| 1,1-Dichloroethene | 5 | U | U | U | U | 2.0 | U | U |
| cis-1,2-Dichloroethene | 5 | U | U | U | 8.6 J | U | U | U |
| trans-1,2-Dichloroethene | 5 | U | U | U | U | U | U | U |
| Dichloromethane | 5 | U | U | U | 1.8 | 29 | U | U |
| 1,2-Dichloropropane | 1 | U | U | U | U | U | U | U |
| cis-1,3-Dichloropropene | 0.4* | U | U | U | U | U | U | U |
| trans-1,3-Dichloropropene | 0.4* | U | U | U | U | U | U | U |
| Ethylbenzene | 5 | U | U | 0.3 | 11 | U | U | U |
| 2-Hexanone | 50 | U | 2.2 J | U | U | 0.4 J | U | U |
| 4-Methyl-2-Pentanone | 50 | U | 3.5 J | 1.2 J | 44 J | U | U | U |
| Styrene | 5 | U | U | 0.2 J | 8.9 | U | U | U |
| 1,1,2,2-Tetrachloroethane | 5 | U | 1 J | U | U | U | U | U |
| Tetrachloroethene | 5 | U | U | U | U | 4.6 | U | U |
| Toluene | 5 | U | U | 0.5 | 18 J | 0.9 | U | U |
| 1,1,1-Trichloroethane | 5 | U | U | U | U | 21.5 | 5.4 | U |

| | | | | | | | | |
|-----------------------|---|---|---|-----|-------|-----|---|---|
| 1,1,2-Trichloroethane | 1 | U | U | U | U | U | U | U |
| Trichloroethene | 5 | U | U | U | 8.8 | U | U | U |
| Vinyl Acetate | 5 | U | U | U | U | U | U | U |
| Vinyl Chloride | 2 | U | U | U | U | U | U | U |
| Xylene (Total) | 5 | U | U | 1.1 | 3.4 J | 0.4 | U | U |

Data validation qualifiers applied by TRC

CMS data not validated

NS = Not Sampled

NA = Not Applicable

* = Applies to sum of cis and trans

U = Not Detected

J = Estimated

TABLE 2A

The RFA-SV reported results of 11 analyses of surface soil (0 - 2 ft. BGS sample interval) samples. The compounds detected and the maximum detected concentrations were:

- Xylenes 2.5J ug/kg
- Di-n-butylphthalate 40J ug/kg
- Acetophenone 85000 ug/kg

The RFA-SV addendum reported analysis of 4 surface soil samples. The compounds detected and the maximum detected concentrations were:

- Acetone 310 ug/kg
- 2-butanone 12J ug/kg
- Carbon disulfide 1J ug/kg
- 1,2 dichlorobenzene 4J ug/kg
- 1,4 dichlorobenzene 4J ug/kg
- Ethylbenzene 210 ug/kg
- Toluene 6J ug/kg
- 1,1,1 trichloroethane 2J ug/kg
- Chloroform 10J ug/kg
- Di-n-Octylphthalate 2J ug/kg
- BEHP 120J ug/kg

The RFI Phase 1 and Phase 2 reported analysis of 7 surface soil samples. The compounds detected and the maximum detected concentrations were:

- Acetone 180 ug/kg
- Methylene chloride 2J ug/kg
- Bromomethane 1J ug/kg
- Tetrachlorethene 2J ug/kg
- Toluene 5J ug/kg
- Chloromethane 5J ug/kg
- Chloroform 10J ug/kg
- Di-n-Butylphthalate 25J ug/kg
- Acetophenone 7300 ug/kg

TABLE 3
WELL INFORMATION

| Well | Depth or Unit | Sampling Dates |
|--|---|--|
| Background Wells MW-1 MW-1B | Overburden MW-1 Bedrock MW-1B | Monitored on a quarterly basis from September 1999 to September 2000, plus four sampling events conducted in December 2001, April 2002, August 2002 and October 2002 |
| Source Area Wells MW-2 MW-5 MW-7 MW-8 | Overburden MW-2 MW-5 MW-7 MW-8 | Monitored on a quarterly basis from September 1999 to September 2000, plus four sampling events conducted in December 2001, April 2002, August 2002 and October 2002 |
| Downgradient offset well MW-6 | Overburden MW-6 | Monitored three times from September 1999 to September 2000, plus four sampling events conducted in December 2001, April 2002, August 2002 and October 2002 |
| Downgradient Boundary Wells MW-3 MW-3B MW-4 MW-4B MW-9 MW-9B | Overburden MW-3 MW-4 MW- Bedrock MW-3B MW-4B MW-9B | MW-1 through MW-8 monitored on a quarterly basis from September 1999 to September 2000, plus four sampling events conducted in December 2001, April 2002, August 2002, and October 2002. MW-9, MW-9B were sampled twice during 2001 - 2002 |